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COMPUTER VISION BASED SIGNATURES TO CLASSIFY STATIC HAND GESTURES

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Feature detection plays a prominent role in image matching, and the state-of-the-art mechanisms choose feature detection to make an abstraction of the selected image or the object. Local decisions have to be taken at every image point to decide whether it is an image feature or not. Irrespective of the feature selection method used for gesture recognition, all patches in the frame are used to locate the hand. The videos with complex background possibly contain areas with sharp edges and dramatic texture changing. Hence applying feature extraction methods based on detecting texture changing extreme points will produce a large number of points of interests from frames of the input video sequence. Hence the procedure of finding a match will be very time consuming. To avoid the deficiency in accuracy and efficiency of the state-of-art methods, this work introduces a geometric based signature for hand gesture recognition. From each visual frame, the hand palm is extricated and four basic geometric measurements are taken. To evade the scaling dependability, the ratios of the measurements are considered. The two ratios introduced in this paperwork are proportional to each other and it is shown that the proportionality constant, *k-factor* depends on the hand gesture. To enhance the accuracy of the classification, the *k-factor* is supported by the respective histogram of hand gesture. The upper histogram sector provides more detailed information about the gesture while the lower provides relatively low information. The ratio between two histogram sectors along with the above mentioned proportionality constant provides a *signature* for each gesture. The method was tested for Sri Lankan Sign Language. Fifteen different static gestures were successfully classified into fifteen clusters and the least squared distance was used to recognize the new gestures. This study concludes that the proposed gesture signatures could be used for gesture classification with a precision of 98.14% where the efficiency is comfortably surpassing template matching, Hidden Markov Model and State-of-art Feature extraction methods such as GFTT (Good features to track), SURF (Speeded up robust features), ORB (Oriented binary robust independent elementary feature) and FAST (Features from accelerated segment test) etc.